

## HOMEWORK 4 - MATH 111

DUE DATE: Friday, October 10

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Find the domain of the function  $f(x) = \sqrt{\frac{x^2-3x-18}{x+1}}$ .
2. Graph the piece-wise linear function

$$f(x) = \begin{cases} x + 6, & \text{if } x \leq 2 \\ -\frac{1}{2}x + 1, & \text{if } x > 2 \end{cases}$$

3. Consider the function  $g(x) = -x^2 + x + 6$ . Its graph is a parabola. Find its vertex and  $x$ -intercepts, state whether it opens up or down and make a rough sketch of it.
4. Consider the function  $g(x) = x^2 + 3x$ . Its graph is a parabola. Find its vertex and  $x$ -intercepts, state whether it opens up or down and make a rough sketch of it.
5. Find the equation of the function whose graph is a parabola with vertex  $V = (1, -3)$  passing through  $(3, 9)$ .
6. When the price of a bizz is  $p(x) = 300 - 2x$ , then  $x$  bizz are sold. Find an expression for the revenue  $R(x)$  in terms of the number  $x$  of bizz. Find the number of bizz that have to be sold to maximize the revenue and the maximum revenue.
7. An object is thrown upward with initial velocity 10 feet per second from an initial height of 11 feet. Then its height after  $t$  seconds is given by  $h(t) = -t^2 + 10t + 11$ . Find the maximum height that the object will attain and how long it will take for the object to hit the ground.
8. Create the sign table and graph the function  $f(x) = x^3 + 3x^2 - 10x$ .